

## Applications Using the DP-CALC™ Micromanometer to Measure Pressure

Application Note TI-113A

The DP-CALC™ Micromanometer measures differential pressure. This means that there are two pressure ports and the DP-CALC™ Micromanometer measures the pressure difference between them. The DP-CALC™ Micromanometer has a (+) port for connecting to the more positive pressure and a (-) port for connecting to the more negative pressure. Using the DP-CALC™ Micromanometer to measure differential pressure is like using a digital voltmeter: when the pressure is connected the same way the tubes are marked, the meter displays a positive number. When the pressure is reversed, the meter displays a negative number.

Although different terms are used to describe different types of pressure, we can think of all pressure as differential pressure. For instance, people use the term "absolute pressure" when they are measuring the *difference* between an absolute vacuum and the pressure of interest. The absolute pressure of ambient air is known as barometric pressure.

### NOTE:

The DP-CALC™ Micromanometer *cannot* measure barometric pressure. If you tried to measure barometric pressure (which is approximately 400 inches of water, or 101 kPa) by connecting the (-) port of the DP-CALC™ Micromanometer to an absolute vacuum, the pressure sensor inside the DP-CALC™ Micromanometer would be destroyed because it is only designed to measure +15.0/-5.0 inches of water (+3.75/-1.25 kPa).

Static pressure describes the difference between the pressure inside and outside a system, disregarding any motion in the system. For instance, when referring to an air duct, static pressure is the difference between the pressure inside the duct and outside the duct, disregarding any air flow inside the duct. Static pressure is often measured inside ducts in order to determine how hard the blower is working. Static pressure can be measured with a static pressure tip (supplied with the DP-CALC Model 8705 or a pitot tube (see Figure 1). Attach this tip to the end of the (+) tube and mount it in a hole in the duct. Let the (-) tube hang so that it will be exposed to ambient conditions. Make sure the static pressure tip is pointed directly into the airflow. If the static pressure in the duct is positive, the DP-CALC™ Micromanometer will display a positive number. If the static pressure is negative, the DP-CALC™ Micromanometer will display a negative number.



The DP-CALC™ Micromanometer can also be used for measuring velocity with a Pitot-static tube (see Figure 2). It automatically calculates the velocity from the pressure reading. The front orifice of the Pitot-static tube senses the total pressure, which is the static pressure in the duct plus the velocity pressure caused by air blowing into this orifice. By connecting the DP-CALC™ Micromanometer properly to the Pitot-static tube, the static pressure can automatically be subtracted from total pressure giving velocity pressure, which the DP-CALC™ Micromanometer uses to calculate velocity.

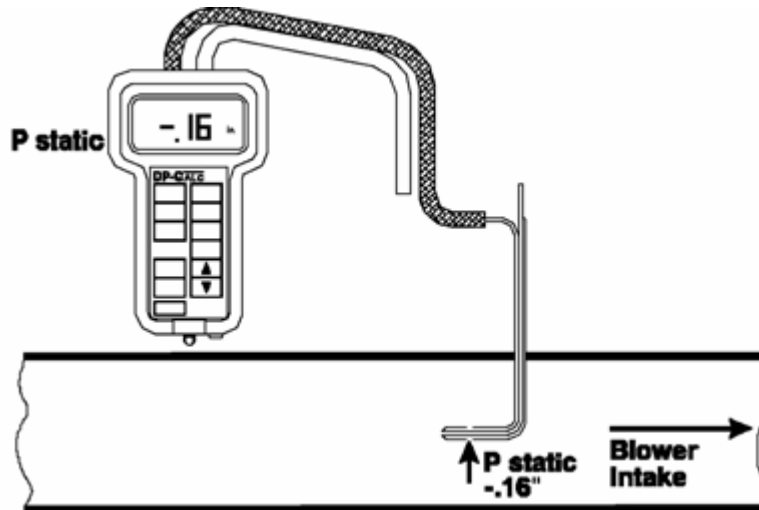


Figure 1: Measuring static pressure with a Pitot-static tube

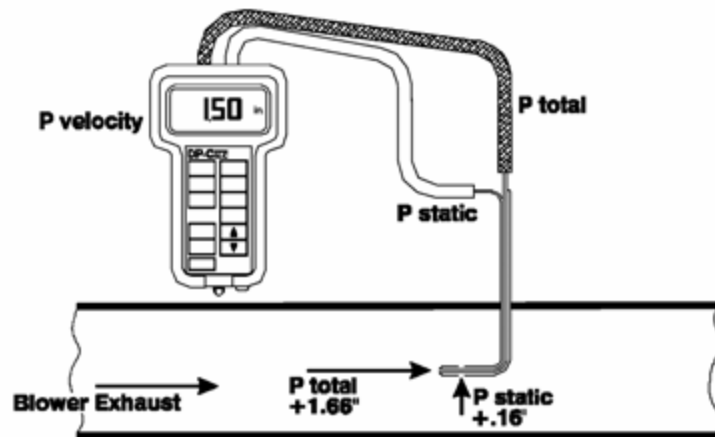


Figure 2: Measuring velocity with a Pitot-static tube

**TSI Incorporated** – 500 Cardigan Road, Shoreview, MN 55126 U.S.A

USA Tel: +1 800 874 2811  
 UK Tel: +44 149 4 459200  
 France Tel: +33 491 11 87 64  
 Germany Tel: +49 241 523030  
 India Tel: +91 80 41132470  
 China Tel: +86 10 8260 1595

E-mail: [info@tsi.com](mailto:info@tsi.com)  
 E-mail: [tsiuk@tsi.com](mailto:tsiuk@tsi.com)  
 E-mail: [tsifrance@tsi.com](mailto:tsifrance@tsi.com)  
 E-mail: [tsigmbh@tsi.com](mailto:tsigmbh@tsi.com)  
 E-mail: [tsi-india@tsi.com](mailto:tsi-india@tsi.com)  
 E-mail: [tsibeijing@tsi.com](mailto:tsibeijing@tsi.com)

Website: [www.tsi.com](http://www.tsi.com)  
 Website: [www.tsiinc.co.uk](http://www.tsiinc.co.uk)  
 Website: [www.tsiinc.fr](http://www.tsiinc.fr)  
 Website: [www.tsiinc.de](http://www.tsiinc.de)



Contact your local TSI Distributor or visit our website [www.tsi.com](http://www.tsi.com) for more detailed specifications.